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(54) Copier/duplicator network

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Réseau de copieur/duplicateur

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US-A- 4 583 834 **US-A- 4 965 676**

EP 0 550 191 B1

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Description

The present invention relates to networks of duplicating machines. More particularly, the present invention relates to an apparatus and method for reading data from a plurality of electronic reprographic machines for centralized storage and manipulation of that data.

It is becoming more and more common for businesses of even moderate size to employ several duplicating machines. As the number of duplicating machines at a particular business increases, the cost and effort associated with gathering information, such as billing data, and keeping users apprised of the current status of the various machines, i.e. which machines are available and capable of performing a given task, also increases.

Known methods for gathering, storing and manipulating data from a plurality of duplicating machines have been limited in the number of categories of data which they are capable of monitoring. Prior systems tended to either inform a user of the current status of particular machines or keep track of billing data.

The information available from prior systems concerning the current status of the machines was usually limited to a few basic inquiries, such as: "is the machine in use?"; "is the machine out of paper?"; "is the machine out of service?". To get more than this basic information, a user must go to the machine. In large offices, and when large numbers of originals need to be carted about, this is extremely inefficient.

Prior systems for monitoring billing information, such as Equitrac, have included separate interfaces into which the user inputs information such as an account number. These devices are hardwired into the duplicating machines and simply count the number of copies made for the particular account. Each of these devices is then linked to a central processing unit, usually a personal computer, where the data is compiled. However, these systems require a separate interface. In addition, these systems monitor only pulses from the duplicating machines indicative of the number of sheets delivered. Billing is based on this number alone and, therefore, different billing rates cannot be applied to the various types of copying jobs performed by the individual machines.

Many duplicating and facsimile machines include a two-way data port, which is commonly an RS232 type port. Some systems, as more fully set out in United States Patent No. 4,965,676 to Ejiri et al., utilize this port to allow remote diagnostic monitoring of duplicating machines. Through this system, duplicating and facsimile machines may be connected to a remote monitoring station over telephone lines via the RS232 port. Various phenomena indicative of the state of the duplicating or facsimile machine are monitored by this system in order to alert the users to potential and actual service needs of the machines.

These RS232 ports may be linked to all of the data sources within the duplicating machines, including the

various auditrons, memory locations for monitoring billing data, by modifying the internal computer software of the individual machines. Standard duplicating machines have 5 to 7 of these auditrons, each monitoring a different type of duplicating operation, such as two sided copying, enlargement, or reduction of documents.

There is a need for a system which is capable of monitoring various billing and other usage data from a plurality of duplicating machines via existing data ports and communicating this data via a single telephone line to a remote monitoring station and which is also capable of giving a user information on the current status of the individual machines on an increased number of topics.

The number of duplicates of documents now required by businesses of all size has made keeping the cost of reproduction services down a top priority. Systems such as Equitrac require hardware which must be added to the duplicating machines. In addition, as duplicating systems have become increasingly complex, the cost of making hardware modifications to these systems has also increased.

Thus there is a need for a system which is capable of monitoring an increased number of data fields from a plurality of duplicating machines without requiring extensive modifications to those machines.

An apparatus for gathering and storing data and for informing users of the current status of individual electrostatic copying machines was disclosed in U.S. Patent No. 4,167,322, to Yano et al. The apparatus disclosed in Yano et al. purported to allow a user to obtain information from any of six (6) categories including individual machine status and billing data. However, the apparatus of Yano et al. required that the data be processed in a microprocessor within one of the electrostatic copying machines. This apparatus also made use of this electrostatic copying machine as a printer for the system. In the system of Yano et al., reproduction activity must be interrupted on that machine whenever the gathered data is printed, and the manipulation of the data gathered is limited by the capabilities of the particular electrostatic machine employed as the data processor. In addition, this apparatus requires the purchase of at least one new electrostatic copying machine having the required microprocessor and printing capabilities.

There is a need for a system which is capable of processing and printing data gathered from a plurality of duplicating machines without interrupting the operation of any of the machines and which does not require the purchase of a specially manufactured duplicating machine.

The present invention provides apparatus for reading data from each of a plurality of image duplicating devices. The apparatus comprises a plurality of image duplicating devices each having a two-way communications port for receiving and transmitting data; and a data processing device electronically coupled to the two-way communications port of each of the image duplicating devices for reading information from and trans-

mitting information to each of the image duplicating devices, characterised in that: the data processing device is part of a central processing station that is not in one of the image duplicating devices; the image duplicating devices each have a plurality of memory locations for storing various predetermined image duplicating device data, each memory location within each respective image duplicating device being linked to that image duplicating device's communication port; and the central processing station being adapted to access selectively the image duplicating device data at each of the memory locations of any one of said image duplicating devices simultaneously while the image duplicating devices are performing an image duplicating operation.

The data processing device may be a computer. At least one image duplicating device may be an electronic reprographic machine.

The data processing device may be selectively coupleable (for example, via a telephone line) to a remote monitoring station, such that data from the image duplicating machines is selectively readable by the remote monitoring station.

The network may further comprise means (for example, a facsimile machine), coupled to the data processing device, for electronically transmitting data to remote locations.

The present invention also provides a method for reading data from and controlling a plurality of image duplicating machines, wherein each image duplicating machine includes a two-way communications port for receiving and transmitting data, comprising the steps of electrically coupling a data processing device to the plurality of image duplicating machines via each image duplicating machines respective two-way communications port; and executing a control program for controlling the data processing device for selectively reading and storing data from the image duplicating machines and transmitting data to the image duplicating machines, characterised in that the method further comprises the steps of: providing a plurality of memory locations in each image duplicating device for storing various predetermined image duplicating device data; linking each memory location to the image duplicating device's communication port; and selectively accessing image duplicating device data at any one of the memory locations of any selected image duplicating device from a central processing station, which includes the data processing device and is not in one of the plurality of image duplicating machines, while said selected image duplicating device is performing an image duplicating operation.

A method in accordance with the invention may further comprise the step of electronically coupling a means for electronically transmitting image data to remote locations to the data processing device. In an embodiment of the invention, the means for electronically transmitting image data to remote locations is a facsimile machine.

The present invention further provides a network of

image duplicating machines having a central data processing device which may be coupled via a single telephone line to a remote monitoring station.

By way of example only, an embodiment of the invention will be described with reference to the accompanying drawing (Fig. 1) which shows a copier network.

Referring to the drawing, several duplicating machines 10 are shown, each connected to a central processing station 12 via the two-way communications port 14, which is preferably an RS232 type port. Each duplicating machine 10 may also include a user interface 22, which allows the user to enter billing information to the duplicating machine and which allows the user to select one of various duplicating operations performable by the machine. The central processing station 12 includes a computer 16, a printer 18, a telecopier machine 19, and a monitor 20 which may provide a constant display of the status of the various duplicating machines 10. As is well known in the art, the central processing station 12 may be connected to a network of computers, thereby allowing access to information from additional locations.

Each duplicating machine 10 includes several memory locations (not shown) for storing various types of data relating to the usage, performance history and current status of the machine. Each of the memory locations of a duplicating machine 10 may be linked to the machine's two-way communications port 14 through known software commands which vary depending on the particular model of the duplicating machine. This data may then be accessed by the central processing station 12, which may then monitor the performance of the various duplicating machines 10. This allows the central processing station 12 to alert users to service requirements of the various machines. In addition, the central processing station may be coupled, via phone line 24, to a remote monitoring station which may provide servicing information to a several networks of duplicating machines.

Modern duplicating machines typically have 5 to 7 separate memory locations called auditrons. Each auditron records the extent of a particular type of duplicating operation. Modern machines, particularly those which are equipped with an RS232 type port, may also have memory locations which keep track of the frequency of malfunctions, such as paper jams, associated with the various duplicating operations performed by the duplicating machine 10. In addition, these machines are generally equipped with memory locations containing information as to the current status of the machine.

In operation, a user of the network shown in the drawing may first consult the central processing station 12 to determine the location and availability of a duplicating machine capable of performing a desired duplicating function. The central processing station 12 then inquires of the various duplicating machines as to the availability of a suitable machine. The controlling software of the central processing station then selectively

links itself to various memory locations in each machine via the two-way communications port 14 to determine the status of various machine parameters, eg. whether a machine is in use, what size paper is loaded into the machine and in what quantity, is the machine capable of handling a certain size original, etc. If a suitable machine is available, the user then proceeds to the identified duplicating machine 10. If there is no suitable duplicating machine 10 available, the user may instruct the central processing station 12 to notify him, via computer network 24, when a suitable machine becomes available.

Upon arriving at the identified machine, prior to initiating duplicating operations, a user may be required to input billing information for the job via user interface 22. The user also selects the particular duplicating operations to be performed via user interface 22. The central processing station 12 then accesses the billing information entered via user interface 22 and the auditor associated with the duplicating operation selected and records the number of each type of operation performed for the identified account. In this way, the network allows separate billing rates to be applied to various types of duplicating operations. For example, there may be a cost reduction associated with making more than a minimum number of duplicates of the same document, and there may be an increased cost associated with making enlargements or reductions of documents. These cost variations could be reflected in the billing rates for the respective operations.

It will be noted that the network allows each of the image duplicating machines 10 to be operated simultaneously with the processing station 12.

Those skilled in the art will recognize that, by modification of the internal software of the various image duplicating machines 10, the two-way communications port 14 may be selectively linked to any of the internal data locations of the image duplicating machines. By linking central data processing station 12 to the various data locations of the image duplicating machines 10, numerous data processing operations are possible which were unavailable through previous systems. For example, accounts may be identified by name instead of by number. In addition, the system is capable of automatically producing bills and other communications and, when coupled to a telecopier, of sending these directly to clients.

Claims

1. A duplicator network comprising:

a plurality of image duplicating devices (10) each having a two-way communications port (14) for receiving and transmitting data; and a data processing device (16) electronically coupled to the two-way communications port of

each of the image duplicating devices for reading information from and transmitting information to each of the image duplicating devices, characterised in that:

the data processing device (16) is part of a central processing station (12) that is not in one of the image duplicating devices;

the image duplicating devices (10) each have a plurality of memory locations for storing various predetermined image duplicating device data, each memory location within each respective image duplicating device being linked to that image duplicating device's communication port (14); and

the central processing station being adapted to access selectively the image duplicating device data at each of the memory locations of any one of said image duplicating devices simultaneously while the image duplicating devices are performing an image duplicating operation.

2. A network according to claim 1, wherein the two-way communications port is an RS232 type port.

3. A network according to claim 1 or claim 2, wherein the central processing station further includes means (18) for printing data.

4. A network according to any one of the preceding claims, wherein the central processing station is selectively coupleable (24) to a remote monitoring station, such that data from the image duplicating machines is selectively readable by the remote monitoring station; and wherein the central processing station is preferably coupleable to the remote monitoring station via a phone line.

5. A network according to any one of the preceding claims, further comprising means (19), coupled to the central processing station, for electronically transmitting data to remote locations; and preferably said means for electronically transmitting data is a telecopier machine.

6. A method for reading data from and controlling a plurality of image duplicating machines, wherein each image duplicating machine includes a two-way communications port for receiving and transmitting data, comprising the steps of:

electrically coupling a data processing device to the plurality of image duplicating machines via each image duplicating machine's respective two-way communications port; and executing a control program for controlling the data processing device for selectively reading and storing data from the image duplicating machines and transmitting data to the image du-

plicating machines, characterised in that the method further comprises the steps of:
 providing a plurality of memory locations in each image duplicating device for storing various predetermined image duplicating device data;
 linking each memory location to the image duplicating device's communication port; and
 selectively accessing image duplicating device data at any one of the memory locations of any selected image duplicating device from a central processing station, which includes the data processing device and is not in one of the plurality of image duplicating machines, while said selected image duplicating device is performing an image duplicating operation.

7. A method according to claim 6, further comprising the step of coupling the data processing device to a remote monitoring station, such that data from the image duplicating machines is selectively readable by the remote monitoring station.

8. A method according to claims 6 or 7, further comprising the step of electronically coupling, to the data processing device, means for electronically transmitting image data to remote locations.

9. A method according to any of claims 6-8 in which the user may consult the central processing location to determine location and availability of an image duplicating device capable of performing a desired duplicating function, the method further comprising the steps of:

when a user consults the central processing location, selectively linking from the central processing station to each of the image duplicating devices to determine availability of a device capable of performing the desired duplicating function; and
 determining whether an image duplicating device capable of performing the desired duplicating function is available.

10. A method according to claim 9 in which, if there is no image duplicating device available capable of performing the desired duplicating function, the user may instruct the central processing station to notify when a capable device becomes available, the method further comprising the step of:

notifying the user when an image duplicating device capable of performing the desired duplicating function becomes available.

Patentansprüche

1. Vervielfältigungsnetzwerk mit

einer Vielzahl von Bildvervielfältigungseinrichtungen (10), die jeweils bidirektionale Kommunikationsports (14) zum Empfangen und Übertragen von Daten aufweisen, und

einer Datenverarbeitungseinrichtung (16), die elektronisch mit dem bidirektionalen Kommunikationsport jeder der Bildvervielfältigungseinrichtungen zum Lesen von Information von und zum Übertragen von Information zu jeder der Bildvervielfältigungseinrichtungen verbunden ist, dadurch gekennzeichnet, daß

die Datenverarbeitungseinrichtung (16) Teil einer zentralen Verarbeitungsstation (12) ist, die nicht Teil der Bildvervielfältigungseinrichtungen ist,

die Bildvervielfältigungseinrichtungen (10) jeweils eine Vielzahl von Speicherlokalationen zum Speichern der verschiedenen vorbestimmten Bildvervielfältigungseinrichtungs-Daten aufweisen, wobei jede Speicherlokation in der entsprechenden Bildvervielfältigungseinrichtung mit dem Kommunikationsport (14) der Bildvervielfältigungseinrichtung verbunden ist, und

die zentrale Verarbeitungsstation dafür ausgebildet ist, selektiv auf die Bildvervielfältigungseinrichtungs-Daten an jeder der Speicherlokalationen einer der Bildvervielfältigungseinrichtungen zuzugreifen, wobei gleichzeitig die Bildvervielfältigungseinrichtungen eine Bildvervielfältigungsoperation ausführen.

2. Netzwerk nach Anspruch 1, wobei der bidirektionale Kommunikationsport ein Port des RS232-Typs ist.

3. Netzwerk nach Anspruch 1 oder 2, wobei die zentrale Verarbeitungsstation weiterhin eine Einrichtung (18) zum Drucken von Daten umfaßt.

4. Netzwerk nach wenigstens einem der vorstehenden Ansprüche, wobei die zentrale Verarbeitungsstation selektiv mit einer entfernten Überwachungsstation verbunden werden kann (24), so daß Daten aus den Bildvervielfältigungsgeräten selektiv durch die entfernte Überwachungsstation gelesen werden können, wobei die zentrale Verarbeitungsstation über eine Telefonleitung mit der entfernten Überwachungsstation verbunden werden kann.

5. Netzwerk nach wenigstens einem der vorstehenden Ansprüche, das wenigstens eine mit der zentralen Verarbeitungsstation verbundene Einrichtung (19) zum elektronischen Übertragen der Daten zu entfernten Lokationen umfaßt, wobei die Einrichtung zum elektronischen Übertragen von Daten ein Telekopiergerät ist.

6. Verfahren zum Lesen von Daten aus Bildervielfältigungsgeräten und zum Steuern derselben, wobei jedes Bildervielfältigungsgerät einen bidirektionalen Kommunikationsport zum Empfangen und Übertragen von Daten aufweist, wobei das Verfahren folgende Schritte umfaßt:

elektrisches Verbinden einer Datenverarbeitungseinrichtung mit der Vielzahl von Bildervielfältigungsgeräten jeweils über den bidirektionalen Kommunikationsport jedes Bildervielfältigungsgeräts, und

Ausführen eines Steuerprogramms zum Steuern der Datenverarbeitungseinrichtung zum selektiven Lesen und Speichern von Daten aus den Bildervielfältigungsgeräten und zum Übertragen von Daten zu den Bildervielfältigungsgeräten, dadurch gekennzeichnet, daß das Verfahren weiterhin folgende Schritte umfaßt:

Vorsehen einer Vielzahl von Speicherlokationen in jeder Bildervielfältigungseinrichtung zum Speichern von verschiedenen vorbestimmten Bildervielfältigungsdaten,

Verbinden jeder Speicherlokation mit dem Kommunikationsport der Bildervielfältigungseinrichtung, und

selektives Zugreifen auf die Bildervielfältigungseinrichtungs-Daten in einer der Speicherlokationen einer ausgewählten Bildervielfältigungseinrichtung von einer zentralen Verarbeitungsstation aus, die die Datenverarbeitungseinrichtung umfaßt und nicht in einer aus der Vielzahl von Bildervielfältigungsgeräten vorgesehen ist, während die ausgewählte Bildervielfältigungseinrichtung eine Bildervielfältigungsoperation ausführt.

7. Verfahren nach Anspruch 6, das weiterhin einen Schritt zum Verbinden der Datenverarbeitungseinrichtung mit einer entfernten Überwachungsstation umfaßt, so daß Daten aus den Bildervielfältigungsgeräten selektiv durch die entfernte Überwachungsstation gelesen werden können.

8. Verfahren nach Anspruch 6 oder 7, das weiterhin einen Schritt umfaßt, um mit der Datenverarbeitungseinrichtung eine Einrichtung zum elektronischen Übertragen von Bilddaten zu entfernten Lokationen elektronisch zu verbinden.

9. Verfahren nach wenigstens einem der Ansprüche 6 bis 8, wobei der Benutzer die zentrale Verarbeitungsstation auffordern kann, die Lokation und die Verfügbarkeit einer Bildervielfältigungseinrichtung zu bestimmen, die in der Lage ist, eine gewünschte Vervielfältigungsfunktion auszuführen, wobei das Verfahren weiterhin folgende Schritte umfaßt:

selektives Verbinden der zentralen Verarbeitungsstation mit jeder der Bildervielfältigungseinrichtungen, um die Verfügbarkeit einer Einrichtung, die in der Lage ist, die gewünschte Vervielfältigungsfunktion auszuführen, zu bestimmen, wenn ein Benutzer die zentrale Verarbeitungsstation auffordert, und

Bestimmen, ob eine Bildervielfältigungseinrichtung in der Lage ist, die gewünschte Vervielfältigungsfunktion auszuführen.

10. Verfahren nach Anspruch 9, wobei der Benutzer, wenn keine Bildervielfältigungseinrichtung, die in der Lage ist, die gewünschte Vervielfältigungsfunktion auszuführen, verfügbar ist, die zentrale Verarbeitungsstation anweisen kann, eine Benachrichtigung auszugeben, wenn eine derartige Einrichtung verfügbar wird, wobei das Verfahren weiterhin den folgenden Schritt umfaßt:

Benachrichtigen des Benutzers, wenn eine Bildervielfältigungseinrichtung, die in der Lage ist, die gewünschte Vervielfältigungsfunktion auszuführen, verfügbar wird.

Revendications

1. Réseau de duplicateurs comprenant :

une pluralité de dispositifs de duplication d'images (10) comportant chacun un point d'accès de communications bilatérales (14) destiné à recevoir et à émettre des données, et un dispositif de traitement de données (16) relié électroniquement au point d'accès de communications bilatérales de chacun des dispositifs de duplication d'images afin de lire des informations à partir de chacun des dispositifs de duplication d'images et d'émettre des informations vers celui-ci, caractérisé en ce que : le dispositif de traitement de données (16) fait partie d'un poste de traitement central (12) qui

n'est pas l'un des dispositifs de duplication d'images,

les dispositifs de duplication d'images (10) comportent chacun une pluralité d'emplacements en mémoire afin de mémoriser diverses données du dispositif de duplication d'images prédéterminées, chaque emplacement en mémoire à l'intérieur de chaque dispositif de duplication d'images respectif étant relié au point d'accès de communications (14) de ce dispositif de duplication d'images, et le poste de traitement central est adapté pour accéder sélectivement aux données du dispositif de duplication d'images au niveau de chacun des emplacements en mémoire de l'un quelconque desdits dispositifs de duplication d'images simultanément à l'exécution par les dispositifs de duplication d'images d'une opération de duplication d'images.

2. Réseau selon la revendication 1, dans lequel le point d'accès de communications bilatérales est un point d'accès du type RS232.

3. Réseau selon la revendication 1 ou la revendication 2, dans lequel le poste de traitement central comprend en outre un moyen (18) destiné à imprimer des données.

4. Réseau selon l'une quelconque des revendications précédentes, dans lequel le poste de traitement central peut être relié de façon sélective (24) à une station de surveillance à distance, de sorte que les données provenant des machines de duplication d'images soient lisibles de façon sélective par la station de surveillance à distance, et dans lequel le poste de traitement central peut de préférence être relié au poste de surveillance à distance par l'intermédiaire d'une ligne téléphonique.

5. Réseau selon l'une quelconque des revendications précédentes, comprenant en outre un moyen (19), relié au poste de traitement central, afin de transmettre électroniquement des données à des emplacements à distance, et de préférence, ledit moyen destiné à transmettre électroniquement des données est une machine de télécopie.

6. Procédé de lecture de données à partir d'une pluralité de machines de duplication d'images et de commande de celles-ci, dans lequel chaque machine de duplication d'images comprend un point d'accès de communications bilatérales destiné à recevoir et à émettre des données, comprenant les étapes consistant à :

relier électriquement un dispositif de traitement de données à la pluralité de machines de du-

plication d'images par l'intermédiaire du point d'accès de communications bilatérales respectif de chaque machine de duplication d'images, et

exécuter un programme de commande destiné à commander le dispositif de traitement de données afin de lire et mémoriser sélectivement des données à partir des machines de duplication d'images et transmettre des données aux machines de duplication d'images, caractérisé en ce que le procédé comprend en outre les étapes consistant à :

prévoir une pluralité d'emplacements en mémoire dans chaque dispositif de duplication d'images afin de mémoriser diverses données du dispositif de duplication d'images prédéterminées,

relier chaque emplacement en mémoire au point d'accès de communications du dispositif de duplication d'images, et

accéder sélectivement aux données du dispositif de duplication d'images au niveau de l'un quelconque des emplacements en mémoire d'un quelconque dispositif de duplication d'images sélectionné à partir d'un poste de traitement central, qui comprend le dispositif de traitement de données et ne fait pas partie de la pluralité des machines de duplication d'images, pendant que ledit dispositif de duplication d'images sélectionné exécute une opération de duplication d'images.

7. Procédé selon la revendication 6, comprenant en outre l'étape consistant à relier le dispositif de traitement de données à une station de surveillance à distance, de sorte que les données provenant des machines de duplication d'images soient lisibles sélectivement par la station de surveillance à distance.

8. Procédé selon les revendications 6 ou 7, comprenant en outre l'étape consistant à relier électroniquement, au dispositif de traitement de données, un moyen destiné à transmettre électroniquement des données d'image à des emplacements à distance.

9. Procédé selon l'une quelconque des revendications 6 à 8, dans lequel l'utilisateur peut consulter l'emplacement de traitement central pour déterminer l'emplacement et la disponibilité d'un dispositif de duplication d'images capable d'exécuter une fonction de duplication désirée, le procédé comprenant en outre les étapes consistant à :

lorsqu'un utilisateur consulte l'emplacement de traitement central, relier sélectivement à partir du poste de traitement central chacun des dis-

positifs de duplication d'images afin de déterminer la disponibilité d'un dispositif capable d'exécuter la fonction de duplication désirée, et déterminer si un dispositif de duplication d'images capable d'exécuter la fonction de duplication désirée est disponible. 5

10. Procédé selon la revendication 9 dans lequel, s'il n'existe pas de dispositif de duplication d'images disponible capable d'exécuter la fonction de duplication désirée, l'utilisateur peut donner pour instruction au poste de traitement central de lui notifier lorsqu'un dispositif capable devient disponible, le procédé comprenant en outre l'étape consistant à : 10

notifier à l'utilisateur, lorsqu'un dispositif de duplication d'images capable d'exécuter la fonction de duplication désirée, devient disponible. 15

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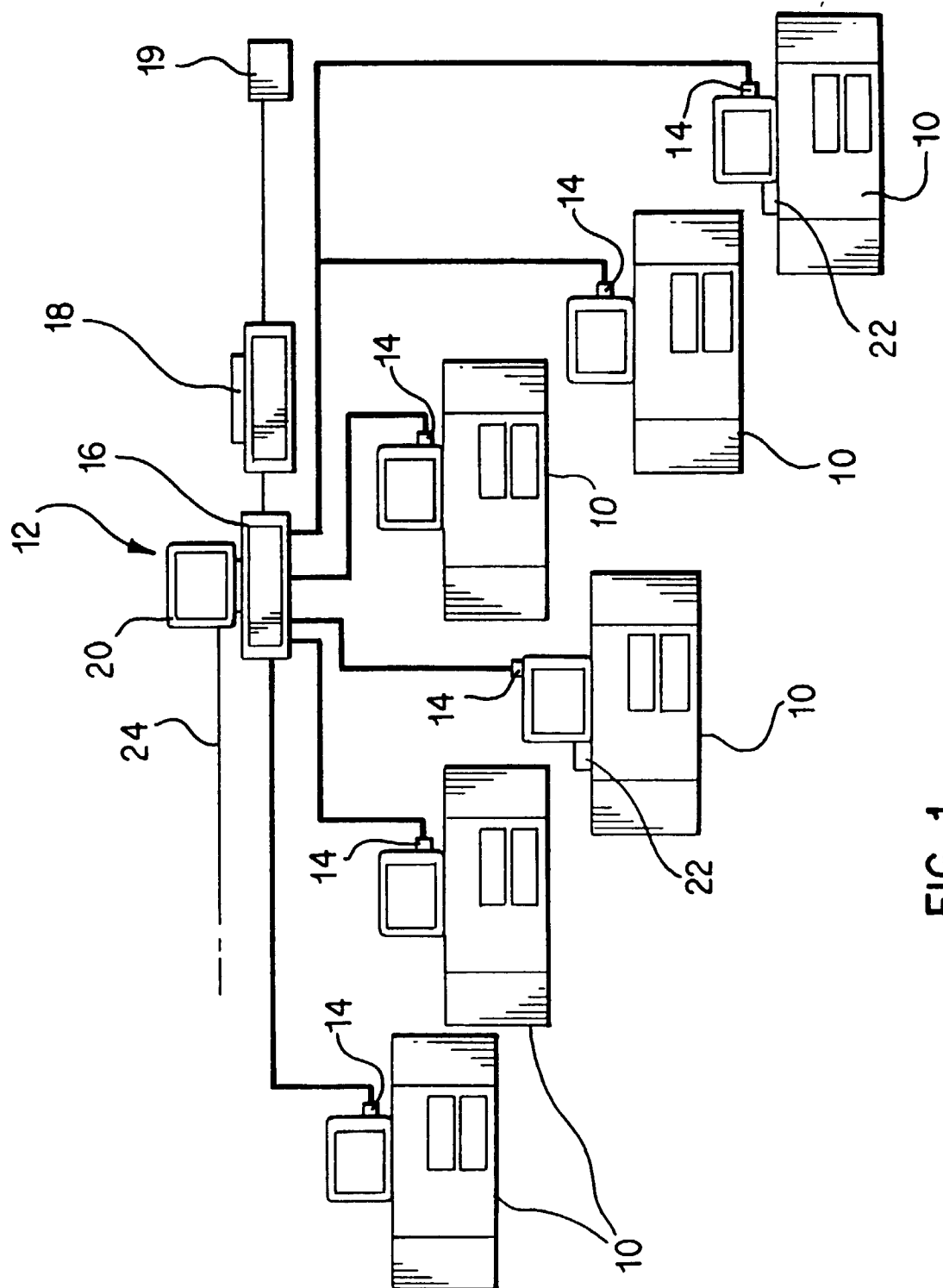


FIG. 1